

ABSTRACT OF THE DISCLOSURE

Refractive index change inducing light UV outputted from a light source passes a shutter and an optical system, and then is reflected by a mirror, so  
5 as to irradiate an optical fiber by way of a phase grating mask. A diffracting action of the phase grating mask generates a (+)first-order light component and a (-)first-order light component, which interfere with each other, thereby generating interference  
10 fringes with a fringe interval  $\Lambda$ . As the mirror moves along the z axis, an irradiation position at which the optical fiber is irradiated with the refractive index change inducing light UV by way of the phase grating mask is scanned. While moving the mirror upon  
15 irradiation with the refractive index change inducing light UV, the phase grating mask is vibrated along the z axis under the action of a piezoelectric device. The phase or period of vibration varies from scan to scan.